Influenza Key Points

- **Summary Messages**
- **MMWR Influenza-Associated Pediatric Deaths – 2010-2011 Season**
- **MMWR Influenza Activity May – September 2011**

Summary Messages

- CDC recommends an annual flu vaccine as the first and best way to protect against influenza.
- Everyone 6 months of age and older should get a flu vaccine as soon as the 2011-2012 vaccines are available, even if they were vaccinated last season.
- Immunity from vaccination declines over time. For optimal protection, get vaccinated yearly.
- It takes about two weeks after vaccination for immune protection to begin.
- Get your flu vaccine now so you will be protected when flu season starts.
- Although influenza is unpredictable, so far circulating influenza viruses are well-matched with the viruses that the vaccine will protect against so this season's vaccine should offer good protection. (See "MMWR Influenza Activity May—September 2011" key points below for more information.)
- According to vaccine manufacturers, more than 67 million doses of influenza vaccine already have been distributed in the United States.
- There also are more vaccination options this season: the regular trivalent inactivated vaccine (flu shot), an intradermal vaccine given with a smaller needle, the high dose vaccine for people 65 and older and the nasal spray vaccine.
- As this week's MMWR report on influenza-associated pediatric mortality underscores, flu is serious, potentially fatal, and even otherwise healthy people are at risk. (See "MMWR Influenza Associated Pediatric Deaths—2010-2011 Season" key points below for more information.)
- Skipping vaccination can put you and your family at unnecessary risk.

MMWR - Surveillance for Influenza-associated Pediatric Deaths – United States, September 1, 2010 – August 31, 2011

- On September 16, 2011, the Morbidity and Mortality Weekly Report (MMWR) issued a report titled Surveillance for Influenza-associated Pediatric Deaths – United States, September 1, 2010 – August 31, 2011.
- The report is available at http://www.cdc.gov/mmwr/ . A related press release is available at http://www.cdc.gov/media/index.html .
- The report details information related to the 115 influenza-associated pediatric deaths received by CDC from September 2010 through August 2011.
- Influenza-related deaths in children are tragic, with nearly half of deaths occurring in children younger than five years of age.
- This MMWR report highlights areas where improvements could be made to lessen the risk of similar tragedies occurring.

DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION
SAFER • HEALTHIER • PEOPLE™

For example:

- Among the 74 children six months or older for whom information was available regarding their influenza vaccination status, only 23% (17) had been fully vaccinated against influenza. CDC recommends that all children 6 months and older get an annual flu vaccine. Last year's vaccine for the 2010-2011 flu season was well-matched with circulating influenza viruses.
- Of the 94 children who died in a health care facility, less than half (47) received antiviral drug therapy (almost always with oseltamivir). CDC recommends treatment with influenza antiviral medications in patients with confirmed or suspected influenza who are hospitalized, have severe/progressive illness, or who are at higher risk for influenza complications.

Other interesting findings:

- Among the children who died, roughly half had a high-risk medical condition that placed them at higher risk of serious flu complications. The other half did not. This underscores the fact that even previously healthy children can get very sick from the flu and die.
- Vaccination rates were better among children with high-risk medical conditions (31%) versus children who did not have an identified high-risk medical condition (12%) but lower than the estimated national vaccination rate of 49% for children during the 2010-11 season.
- Among children with any high-risk medical condition (57), neurologic disorders were most commonly reported. Of 57 children with high-risk medical conditions, 54% had a neurologic disorder, 30% had pulmonary disease, 25% had a chromosome or genetic disorder, 19% had congenital heart disease or cardiac disease and 19% had asthma or reactive airway disease.
- The majority of the pediatric flu-related deaths reported to CDC occurred in white non-Hispanic children (52%), followed by black non-Hispanic children (18%), Hispanic children (15%), Asian children (3%), American Indian/Alaskan Native children (3%) and Native Hawaiian/Pacific Islander children (2%). The race/ethnicity of eight children (7%) was unknown.
- The median illness duration was four days among children without a high-risk condition and seven days among children with at least one high-risk condition.
- Information on location of death was available for 114 children; 18% died outside of the hospital, 18% died in the emergency department, and 65% died in the hospital.
- Children without high-risk medical conditions were significantly more likely to die at home or in the emergency department.
- The most frequent complications reported were radiographically confirmed pneumonia (62%), shock or sepsis (40%), and acute respiratory distress syndrome (ARDS) (34%).
- Influenza A virus was identified in 62% of deaths.
- Twenty-six percent of the deaths were associated with 2009 influenza A (H1N1), 18% were associated with influenza A (H3N2), and 17% were associated with to influenza A viruses for which the subtype was not determined.
- Influenza B virus was identified in 38% of deaths.
- Specimens were collected for bacterial culture from 64 children.
- Of the 64 children who had specimens collected, 39% (25) had a positive culture.
- Most (68%) positive cultures occurred in children who had no high-risk medical condition.
- S. aureus (36%), S. pneumoniae (24%), and Group A streptococcus (12%) were the pathogens most commonly identified in the children with invasive bacterial coinfection.

- Two of the *S. aureus* isolates were sensitive to methicillin,
- Six were methicillin-resistant, and
- One did not have sensitivity testing performed.

- Empiric antibiotic therapy, in addition to early antiviral therapy, is recommended for patients with community-acquired pneumonia and suspected influenza coinfection.

Vaccination

- The single best way to protect against seasonal flu and its potential severe complications in children is for them to get a seasonal influenza vaccine each year**.**
- Vaccination is especially important for children younger than 5 years of age and children of any age with a long-term health condition like asthma, diabetes and heart disease. These children are at higher risk of serious flu complications if they get the flu.
- A number of studies have shown that the flu vaccine works, but how well the vaccine works can change from year to year and vary among different groups of people. The ability of the flu vaccine to protect a person depends on at least two things: 1) the age and health of the person getting the vaccine and, 2) the similarity or "match" between the virus strains in the vaccine and those being spread in the community.
- Vaccine effectiveness is not 100%, and some people can still get the flu. For instance, children with certain chronic illnesses might develop less immunity than healthy young adults after vaccination. However, even for these children with high-risk conditions, the flu vaccine still can provide important protection against getting severe complications from the flu.

Antiviral drug therapy

- When used for treatment, antiviral drugs can shorten the duration of illness by 1 or 2 days.
- They can also prevent serious flu complications.
- Studies have shown that flu antiviral drugs work best for treatment if they are started within 2 days of getting sick. There may still be benefit in treating people with antiviral drugs even after two days have gone by, especially if the sick person has a greater chance of serious flu complications or if the person has certain symptoms (such as shortness of breath, chest pain/pressure, dizziness, or confusion) or is in the hospital because of the flu.

Background

- In 2004, influenza-associated deaths in children became a nationally notifiable condition, which allowed CDC to collect information about laboratory confirmed pediatric deaths on a national level in a standardized way through the Influenza Associated Pediatric Mortality Surveillance System.
- Between 2004 and the start of the pandemic in April 2009, seasonal influenza-associated pediatric deaths reported to CDC by states have ranged from a low of 46 deaths during the 2005-2006 season to a high of 88 deaths during the 2007-2008 season.
- Between April 26, 2009 and October 2, 2010, (the period of time during which the 2009 H1N1 pandemic occurred) 347 laboratory-confirmed influenza-associated deaths in children were officially reported to CDC by states. (These deaths include 2009 H1N1-associated deaths in addition to influenza A viruses for which the subtype was undetermined, seasonal influenza A (H1N1), an influenza virus for which the type (A or B) was not determined and influenza B-associated deaths).
- Despite having a national reporting system, experts believe that reports of influenza associated deaths in children underestimate of the true number of flu related deaths.
- The reason why laboratory-confirmed data on deaths reported to CDC underestimate the true number that occur each year is likely due to a combination of incomplete testing, use of influenza tests that are

not highly sensitive, or diagnoses that attribute deaths to other causes, for example, secondary complications to influenza.

- According to a recent Morbidity and Mortality Weekly Report (MMWR) estimating influenza-associated deaths in all age groups from 1976-2007, yearly influenza-associated pediatric deaths ranged from a low of about 40 to a high of over 200. This MMWR is available online: www.cdc.gov/mmwr/preview/mmwrhtml/mm5933a1.htm?s_cid=mm5933a1_w

Other Key Points

- Because of confidentiality issues, CDC does not discuss or give details on individual cases. (Additional questions may be referred to the departments of health for each state).
- These deaths are a somber reminder of the importance of protecting children from the flu – especially those at high risk from serious flu-related complications.
- Children at highest risk from flu complications include:
  - Children younger than 5 years old (and especially those less than 2 years old), including children younger than 6 months of age who are too young to be vaccinated.
  - Children (of any age) with chronic medical conditions like neurologic disorders, asthma, diabetes or heart disease.
- Vaccination is the first and most important step in protecting your family against the flu.
- For optimal protection against influenza viruses, annual influenza vaccination is recommended regardless of whether the vaccine virus strains have changed since the previous season.
- Infants younger than 6 months old are too young to be vaccinated. Protect them by getting yourself, other children and family in the household, and other close contacts vaccinated. This will help prevent spreading the virus to infants.
- Getting vaccinated during pregnancy can protect the mother and may offer your newborn protection from the flu after birth.
- Children 6 months through 8 years of age require 2 doses of influenza vaccine during their first season of vaccination (administered a minimum of 4 weeks apart) to optimize immune response.
- Because the 2011–2012 vaccine strains are unchanged from the 2010–2011 season, children in this age group who received at least 1 dose of the 2010–2011 seasonal vaccine will require only 1 dose of the 2011–2012 seasonal vaccine.
- Children in this age group who did not receive at least one dose of the 2010-2011 vaccine, or for whom it is not certain whether the 2010-2011 was received, should receive 2 doses of the 2011-2012 seasonal vaccine.
- Recommendations regarding the number of doses for this age group might change for the 2012–2013 season if vaccine antigens change.
- If possible, the first dose should be given as soon as vaccine becomes available. The second dose should be given 28 or more days after the first dose. The first dose "primes" the immune system; the second dose provides immune protection. Children who only get one dose but need two doses can have reduced or no protection against the flu.
- The flu can make some health conditions worse. As a result, vaccination is especially important for protecting children with asthma, diabetes (1 and 2), or other long-term health conditions because they are at increased risk for serious complications from flu, such as pneumonia. Children also should be current on other vaccines that can help prevent pneumonia, like pneumococcal and Hib vaccines.

MMWR Update: Influenza Activity – United States and Worldwide, May 22, 2011-September 3, 2011

- The September 16, 2011 *Morbidity and Mortality Weekly Report (MMWR)* contains a summary of influenza activity in the United States and worldwide from May 22, 2011 – September 3, 2011.
- The report is available at http://www.cdc.gov/mmwr/ .
- Key findings from U.S. and international influenza activity from May 22, 2011 – September 3, 2011 include the following:
    - Influenza activity remained low in Europe and North America during the period covered in this report.
    - Influenza activity was typical in the Southern Hemisphere for this time of year.
    - Influenza B, 2009 influenza A (H1N1), and influenza A (H3N2) viruses co-circulated worldwide.
    - Influenza viruses characterized from May 22 through September 3 were well-matched to the strains selected for inclusion in the 2011-2012 influenza vaccine for the Northern Hemisphere.

Viral Surveillance

- From May 22 through September 3, the majority of influenza viruses identified by the World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System (NREVSS) collaborating laboratories were influenza A viruses (71%), followed by influenza B viruses (29%).
- Of the influenza A viruses that were subtyped, 62% were influenza A (H3N2) viruses, and 38% were 2009 influenza A (H1N1) viruses. (Influenza B viruses are not divided into subtypes).
- Influenza A (H3N2) viruses predominated, but 2009 influenza A (H1N1) and influenza B viruses also circulated.

Antigenic Characterization

- For the time period covered in this report, CDC antigenically characterized 156 influenza viruses collected from laboratories worldwide, including 68 2009 influenza A (H1N1) viruses, 54 influenza A (H3N2) viruses, and 34 influenza B viruses.
- The vast majority of viruses that were antigenically characterized were closely related to the components included in the 2011-2012 seasonal influenza vaccine for the Northern Hemisphere.
    - The components of the 2011-2012 seasonal influenza vaccine for the United States include:
        - an A/California/7/2009 (H1N1)-like virus,
        - an A/Perth/16/2009 (H3N2)-like virus, and
        - B/Brisbane/60/2008-like virus.
- Of the 68 2009 H1N1 influenza A (H1N1) viruses tested, all 68 (100%) were characterized as A/California/7/2009-like.
- Of the 54 influenza A (H3N2) viruses tested, all 54 (100%) were characterized as A/Perth/16/2009-like.
- Of the 34 influenza B viruses tested, 31 (91%) belonged to the B/Victoria lineage of viruses.
    - Of the 31 influenza B viruses that belonged to the B/Victoria lineage, all 31 (100%) were characterized as B/Brisbane/60/2008-like.
    - Of the 34 influenza B viruses, 3 (9%) were identified as belonging to the B/Yamagata lineage of viruses.

Antiviral Resistance

- From May 22 to September 3, 2011, 154 influenza virus specimens from the United States and around the world were tested for antiviral resistance.
- All 2009 influenza A (H1N1), influenza A (H3N2), and influenza B viruses tested for resistance were sensitive to both oseltamivir and zanamivir.
- High levels of resistance to the adamantanes (amantadine and rimantadine) persist among 2009 influenza A (H1N1) and A (H3N2) viruses currently circulating globally. Influenza B viruses are not susceptible to adamantanes.
- Worldwide, oseltamivir-resistant 2009 influenza A (H1N1) viruses have been detected occasionally. For example, in the Newcastle region of Australia, in a limited geographic area, 25 cases of oseltamivir-resistant 2009 influenza A (H1N1) viruses were identified from May to August (*5*).
- CDC will continue to conduct surveillance for antiviral resistance among influenza viruses throughout the upcoming season.

Outpatient Illness Surveillance

- The weekly national percentage of outpatient visits for influenza-like illness (ILI) reported by the U.S. Outpatient ILI Surveillance Network (ILINet) remained below the national baseline of 2.5% during the period of May 22 through September 3, and ranged from 0.5% to 1.2%.

Pneumonia and Influenza-Related Mortality

- The percentage of deaths attributed to pneumonia and influenza (P&I) reported to the 122 Cities Mortality Reporting System for the period of May 22 through September 3 was slightly elevated for three weeks in June, but remained below the epidemic threshold for the remainder of the period.

Influenza-Related Pediatric Mortality

- One influenza-related pediatric death occurring during the period of May 22 through September 3 in the United States was reported and was associated with an influenza B virus.

Novel Influenza A Viruses

- Four cases of human infection with a novel influenza A virus in children were reported in the U.S. during the period of May 22 through September 3 in two states—Indiana (1) and Pennsylvania (3).
    - All four cases were due to a swine-origin Influenza A (H3N2).
    - Two cases were reported in August (Indiana and Pennsylvania), and two cases were reported in September (Pennsylvania). One of the patients is recovering at home from their illness, and the other three have fully recovered.
    - The three children from Pennsylvania had all been to the same agricultural fair, where they came in contact with swine.
    - There is no reported direct contact between the Indiana patient and swine, however a close contact of the patient reported having swine contact.
- Human infection with swine influenza viruses is rare, but it can occur mostly when people are in close proximity to pigs, such as in pig barns and at livestock exhibits housing pigs at fairs.
- Cases of human infection with swine influenza viruses underscore the importance of ongoing human and animal influenza surveillance.
- More information about reports of human infection with swine origin influenza viruses is available online at http://www.cdc.gov/flu/swineflu/soiv_cases.htm.